OIL-FIRED CENTRAL FURNACE

Installation, Operation, and Service Manual
With Users Information Section

Models:

THV1C072A948SA **THV1C072A9V4SA**

⚠ WARNING:

- **Do NOT store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.**
- **Improper installation, adjustment, alteration, service, or maintenance can cause a fire or explosion resulting in property damage, personal injury, or loss of life. For assistance or additional information consult a qualified installer or service agency.**

These instructions should be:

- **read prior to installing the furnace**
- **retained for reference by qualified service personnel**
- **reviewed before performing any service or maintenance**

MO-513
ECN 5396-MA 141211

MADE IN USA

I. SAFETY SECTION

This page contains various warnings and cautions found throughout the Oil Furnace Manual. Please read and comply with the statements below.

⚠WARNING AND CAUTIONS:

⚠WARNING: This furnace is not to be used as a construction heater. **See Page 1.**

⚠ CAUTION MUST BE TAKEN NOT TO EXCEED 90° ROTATION (OF THE FLUE ELBOW) COUNTERCLOCKWISE OR RIGHT FROM THE VERTICAL POSITION. See Page 2.

⚠WARNING: The predetermined limit location on this oil fired furnace has been tested and approved. Any attempt to relocate this safety control or replace this safety control with a control that is not approved, or is incompatible, may result in personal injury, substantial property damage or death. See Page 4.

⚠WARNING: Turn off the electrical power to the unit before attempting to change supply air blower speed wiring. See Page 7

⚠WARNING: THE HEAT EXCHANGER MUST BE CLEANED BY A QUALIFIED SERVICE PERSON. See Page 11.

⚠CAUTION: DO NOT ATTEMPT TO MAKE REPAIRS YOURSELF! See Page 12.

⚠WARNING: The area around the furnace should be kept free and clear of combustible liquids and material, especially papers and rags. See Page 12.

⚠WARNING: NEVER burn garbage or refuse in your furnace. Never try to ignite oil by tossing burning papers or other material into your furnace. See Page 12.

⚠WARNING: This oil furnace is designed to burn No. 1 or No. 2 distillate fuel oil. NEVER USE GASOLINE OR A MIXTURE OF OIL AND GASOLINE. See Page 12.

⚠CAUTION: DO NOT ATTEMPT TO START THE BURNER WHEN:
1. Excess oil has accumulated,
2. The furnace is full of vapors
3. The combustion chamber is very hot.
IF ONE OR MORE OF THESE CONDITIONS EXIST, CONTACT A QUALIFIED SERVICE PERSON. See Page 12.

⚠WARNING: To avoid injury from moving parts, hot surfaces, or electrical shock, shut off the power to the furnace before removing any furnace access doors to service the air filters. See Page 13.

All installations and services must be performed by qualified service personnel.

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II. GENERAL INSTRUCTIONS - READ BEFORE START OF INSTALLATION

1. The heating output capacity of the furnace proposed for installation should be based on a heat loss calculation made according to the manuals provided by the Air Conditioning Contractors of America (ACCA) or the American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. (ASHRAE).

2. All local codes and/or regulations take precedence over the instructions in this manual and should be followed accordingly. In the absence of local codes, installation must conform with these instructions and regulations of the National Fire Protection Association, and to the provisions of the National Electrical Code (ANSI/NFPA 70-1999 or latest edition).

3. The installed furnace must be level and positioned in a central location with respect to outlet registers. It should be located near the chimney to minimize any horizontal run of flue pipe, which may be required.

4. A furnace installed in a residential garage must be installed so the burner and ignition source are located higher than 18 inches above the floor, unless the required combustion air is taken from the exterior of the garage. Also, the furnace must be located or protected to avoid physical damage by vehicles.

⚠**WARNING:** This furnace is not to be used as a construction heater.

5. Listed below are definitions of "COMBUSTIBLE MATERIAL" and "NON-COMBUSTIBLE MATERIAL."

COMBUSTIBLE MATERIAL:
Material made of or surfaced with wood, compressed paper, plant fibers, plastics, or other material that will ignite and burn, whether flame resistant or not.

NON-COMBUSTIBLE MATERIAL:
Material that is not capable of being ignited and burned. Such materials consist entirely of, or a combination of, steel, iron, brick, tile, concrete, slate, or glass.

MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS

TYPE OF UNIT	MODEL NO.[1]	FROM SIDES OF FURNACE	FRONT	TOP & SIDES OF PLENUM	FROM THE FLUE/VENT	REAR
HIGHBOY	THV1C*	0”	Note [1]	1”	7”	0”

Notes: [1] THV1C* front clearance 6” for Closet, 24” for Alcove.

The minimum clearances listed in the preceding table are for fire protection. Clearance for servicing the front of the furnace should be at least 24 inches. A clearance of 24 inches is recommended for passage to all points on the furnace requiring service access.

NOTE: The THV1C* furnace may be installed on combustible flooring.

NOTE: The THV1C* furnace is approved for closet installation. If the furnace is installed in a closet, it requires two openings in the closet door for combustion air, each having a minimum area of 162 sq. inches. This free area intentionally exceeds the recommended minimum free area of 2 square inches per 1000 BTUH of input rate.

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A. VENTING:

NOTE: On the THV1C* it is possible to rotate the flue elbow (which is factory installed for vertical discharge) 90° counterclockwise from the vertical position to adapt to various venting systems.

⚠ CAUTION MUST BE TAKEN NOT TO EXCEED 90° ROTATION (OF THE FLUE ELBOW) COUNTERCLOCKWISE OR RIGHT FROM THE VERTICAL POSITION.

ROTATION OF FRONT FLUE ELBOW

When an installation requires that the flue exit out the left hand side casing on a front flue unit, remove screw securing the 90 deg. elbow and rotate it 90° **counterclockwise.** Then, remove knock-out in side casing and extend vent through the opening.

A trim collar may be ordered from the manufacturer of this furnace to hide the gap around the flue pipe. This trim collar, however, is not required for operation. Trim collar/gasket part numbers(s) R14121 / R330073.

NOTE: ROTATION OF FLUE PIPE IS ONLY ALLOWED FOR LEFT HAND SIDE VENTING APPLICATIONS.

The THV1C* may be vented through a standard correctly sized chimney.

The THV1C* may also be horizontally vented through a side wall. The manufacturer of this furnace has available the Field model RFDVS-45/RFVOP-415 side wall vent kit for such applications. When installing the RFDVS-45/RFVOP-415 side wall vent kit, outside combustion air must also be applied to the burner. The following table identifies application order information.

SIDE WALL VENTING APPLICATION ORDER INFORMATION			
BURNER	FIELD VENT TERMINATION KIT (15' application MAX) PART NUMBER	SIDE WALL VENT ACCESSORIES KIT (BURNER SPECIFIC) PART NUMBER	COMBUSTION AIR INTAKE HOOD KIT (FOR COMBUSTION AIR APPLICATIONS ONLY) PART NUMBER
Beckett AFG	RAOPS8393	RAOPS8394	RAOPS8397

The Field vent kit is set up with 4 inch diameter vent pipe with concentric through-the-wall vent termination/inlet air vent hood. The combustion air inlet pipe diameter is also 4 inch diameter. For Beckett, the combustion air inlet pipe will be reduced to 3" diameter with the Beckett side wall vent kit.

The side wall vent may be installed either through the upper knock-out on the left side casing of the unit or vertically out the top opening of the vestibule. The 4" flexible vent pipe included w/ Field vent kit is able to be installed at 2" clearance to combustibles.

The combustion air inlet can be installed through the either the lower left side casing knock-out or the lower right side casing knock-out.

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B. DRAFT REGULATORS:

A draft regulator is supplied with the furnace and should be installed according to the regulator manufacturer's recommendations. With the burner operating, use a draft gauge to adjust the regulator to the proper setting. (refer to the instructions enclosed with draft regulator to adjust to the proper setting). When the burner air supply and draft are properly adjusted, the overfire draft should be a negative (-).01" to (-).02" WC [1], as measured at the 5/16" overfire air tap (See Fig. 4). This tap is provided in the upper burner mounting plate. To measure the flue draft, punch a small hole in the vent connector pipe as close to the furnace as possible and always before the draft regulator.

Note: 1. Draft overfire may be positive for high fire applications but not to exceed (+).02" WC.

C. DUCT WORK/AIR CONDITIONING/SUPPLY/RETURN AIRFLOW AND AIR TEMPERATURE:

If the furnace is used in connection with summer air conditioning (cooling), the furnace should be installed parallel with or on the upstream side of the evaporator coil to avoid condensation in the furnace heat exchanger. If the cooling unit is installed with a parallel flow arrangement, dampers or other means used to control flow of air should be provided to prevent chilled air from entering the furnace. If such a damper is manually operated, it must be equipped with a means to prevent operation of either unit, unless the damper is in the full heat or cool position.

The supply/return airflow shall be set to obtain an air temperature rise, across the furnace, in the range of 55º to 85ºF. Since the flow resistance of each duct system is slightly different, the airflow (fan speed) may have to be changed in the field to achieve a satisfactory temperature rise.

One way to measure the temperature rise across the furnace is to insert temperature measuring devices (e.g. thermometers) into the return air duct and into the supply air duct about 12 inches from the furnace. After the furnace has been firing continually for over 20 minutes, read the temperature difference between the two (2) thermometers. The temperature difference should not exceed 85ºF, nor be less than 55ºF. A temperature rise of 70ºF is considered to be optimum for comfort.

The blower (fan) speed fan is adjusted by changing the fan motor winding energized by the control system. The furnace is set on fan speed, "ML", at the factory, refer to page 13 of this manual. To adjust the fan speed, change corresponding wire from the appropriate fan speed to the "HEAT" tap on the control.

The duct system should again follow the current design standard of Air Conditioning Contractors of America (ACCA) or ASHRAE Fundamentals volume. The most common location for the A-shaped coil (A style) is shown in Fig. 1.

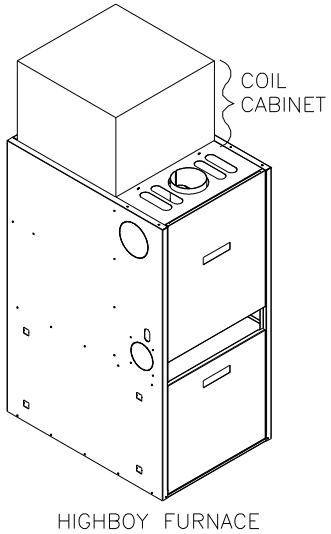

Fig 1: Acceptable locations for the air conditioner evaporator coil.

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NOTICE: The minimum coil pan clearance for a drum type heat exchanger is three inches unless specified otherwise by the individual coil manufacturer.

D. FILTERS MOUNTED EXTERNAL TO FURNACE

On **highboy** furnaces, it is necessary to cut the return air opening in the side or rear casing, depending upon the needs of the specific installation.
The filter rack is provided with the furnace, refer to Fig. 2. For your convenience, (4) locator knock-outs have been placed at the proper locations for the cutout on both the left and right side casings. Cut opening between knockouts and screw filter rack in place.

PLEASE NOTE: While scribing the return air opening, the filter rack can be held in position by tape or similar temporary means.

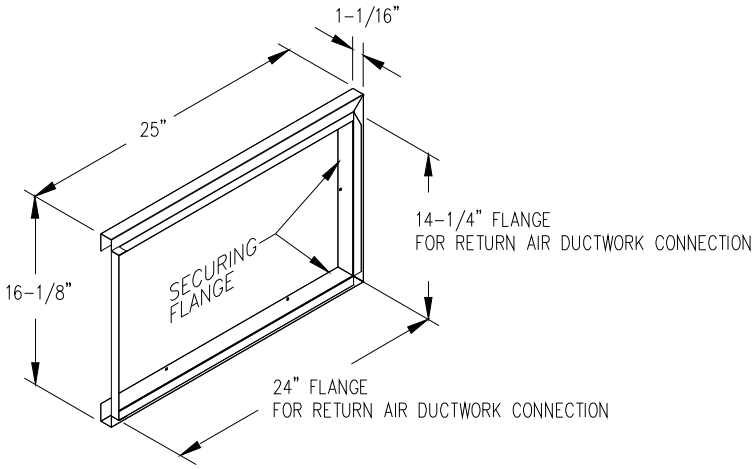

Fig. 2: A typical filter rack and dimensions for the THV1C* furnace.

Connect the return air plenum to the filter rack and slide the filter into place. Dimensions for adapting the return air plenum to the filter rack are provided (See Fig. 2).

E. LIMIT POSITION AND LOCATION

⚠**WARNING:** The predetermined limit location on this oil fired furnace has been tested and approved. Any attempt to relocate this safety control or replace this safety control with a control that is not approved, or is incompatible, may result in personal injury, substantial property damage or death.

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F. BURNER INSTALLATION:

NOTE: The burner is factory installed on this furnace.
NOTICE: Remove all cardboard packing from around chamber before installing burner.
The oil burner will mount on three stud mounting bolts on the lower mounting plate covering the opening in the front of the heat exchanger. The end of the burner tube should be inserted no further than 1/4 inch back from the inside surface of the combustion chamber. A distance further than 1/4 inch back from the inside chamber wall may cause impingement and sooting. This unit is equipped with a chamber retainer (refer to Fig.4). This retainer secures the chamber during shipping and helps to maintain insertion depth. **DO NOT** remove this retainer when installing burner.

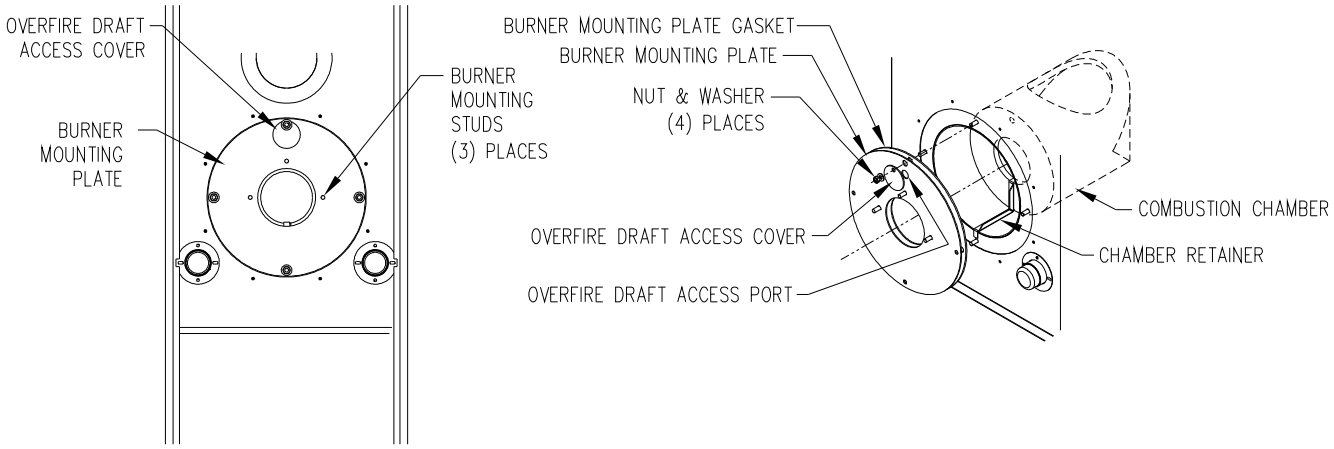

Fig. 4: Typical location of the overfire air tap and components in burner mounting plate area

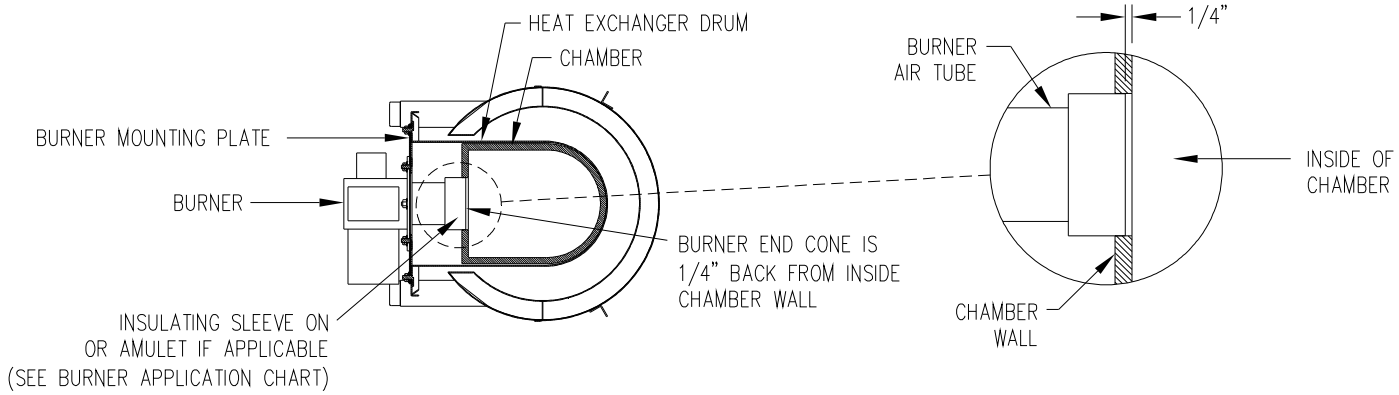

Fig. 5: Burner insertion illustration (Top view)

When mounting the burner, the mounting plate (Fig. 4) must be removed to provide access to the area in front of the combustion chamber. A fiber insulating sleeve or amulet is provided on the burner tube of specific burners (see Fig. 5). See burner application chart for type of insulator. Do not allow the burner tube or end cone to physically touch or protrude into the chamber, as excess heat transfer could result in destruction of the tube, end cone or both. The burner tube/end cone is properly positioned, when the end is ¼ inch back from the inside surface of the combustion chamber wall.

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G. BURNER SPECIFICATIONS AND APPLICATIONS

FURNACE MODEL THV1C* SERIES BURNER	BURNER SPEC NO.	* INS	BURNER MODEL & TUBE LENGTH	HEAD	STATIC PLATE	MAXIMUM NOZZLE SIZE**	SHIPPED NOZZLE SIZE	OIL PUMP PRESSURE (PSIG)
BECKETT (AFG)	EFL201	N	AFG-4.5"	F3	3-5/8U	0.75X80° A	0.60X80° A	120

*** INSULATOR S = SLEEVE OR N = NONE**
THE NOZZLE SIZE GIVES THE NOMINAL FLOWRATE, IN GPH, FOLLOWED BY THE SPRAY ANGLE, IN DEGREE'S, AND THE SPRAY PATTERN, EITHER "A" FOR HOLLOW CONE OR "B" FOR SOLID CONE. FOR EXAMPLE, A NOZZLE RATED AT 0.65 GPH @ 100 PSIG THAT PROVIDES AN 80° SPRAY ANGLE AND A HOLLOW SPRAY PATTERN WOULD BE ABBREVIATED IN THE TABLE AS "0.65 X 80°A".

INPUT CAPACITY SELECTION CHART						
	EQUIVALENT HEAT INPUT RATE*	EFFECTIVE HEATING CAPACITY**	NOZZLE SIZE (GPH x TYPE)			
UNITS	(BTU/HR)	(BTU/HR)	Beckett AFG			
THV1C*	70,000	60,000	0.50 x 80° A			
THV1C*	85,000	69,000	0.60 x 80° A			
THV1C*	106,250	90,000	0.75 x 80° A			

All rates shown achieved with 120 PSIG pump pressure for Beckett AFG.
* Based on #2 domestic heating fuel oil having heating value of 140,000 BTU per gallon.
** Based on thermal efficiency of 84%-85%.

H. ELECTRICAL CONNECTIONS

NOTICE: All field wiring must conform to local, state and national codes.

A disconnect switch equipped with overcurrent protection (e.g. a time delay-type fuse or inverse time, circuit breaker) should be installed in the service line for shutting down and protecting the furnace and electrical system.

Since the furnace is entirely pre-wired at the factory, it is only necessary to connect the building electrical service lines to the two (2) pigtail wires extending from the fan center junction box. The fan center is mounted inside the furnace burner compartment. The service lines to the furnace should be no smaller than 14 Ga., insulated copper wire with a temperature rating of 60ºC, or greater.

Connect an equipment ground wire to the furnace at the fan center junction box. If wiring is run through metal electrical conduit, it may not be necessary to run a separate equipment ground wire. Consult local codes and authorities for specific minimum requirements.

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I. BLOWER MOTOR SPEED SELECTION:

⚠WARNING: Turn off the electrical power to the unit before attempting to change supply air blower speed wiring.

The furnace comes from the factory with the proper cooling speed selected and the heat rise set to approximately 70°F on mid-fire.

The heat rise is determined by the nozzle size and the switch selection on the control board located in the blower compartment for ECM models or blower speed taps for PSC models.

For ECM unit, switches 7 & 8 are used to select the proper blower speed for heating, refer to figure 5A and page 8. For PSC unit, refer to figure 5B and page 10 for blower speed tap selections.

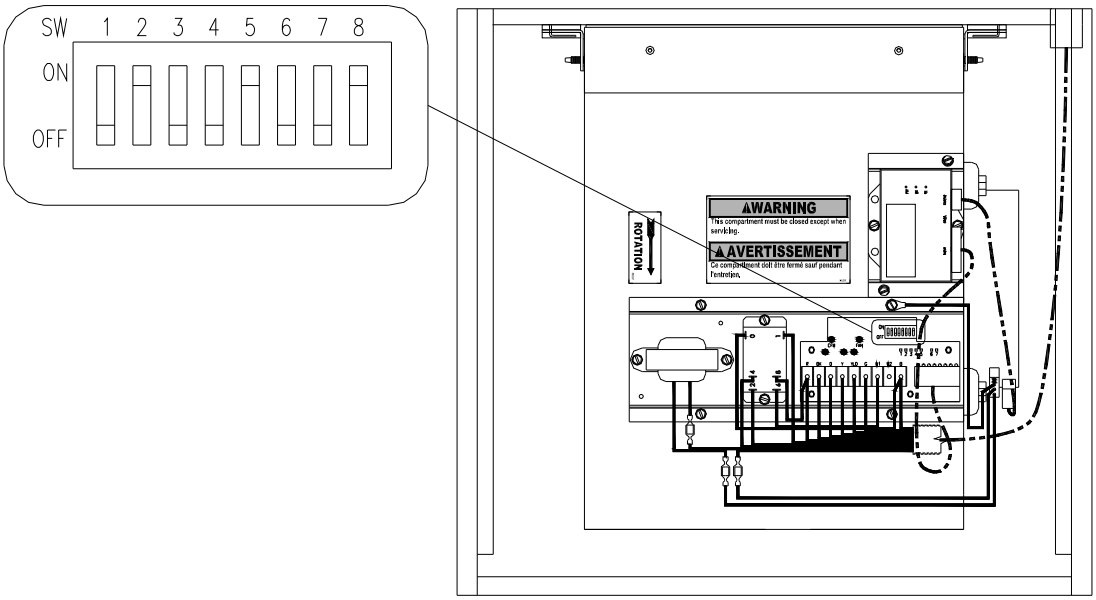

Fig-5A ECM unit

All installations and services must be performed by qualified service personnel.

ECM air flow DIP switch settings:

	outdoor unit size (tons)	airflow setting	*dip switch setting*					*external static pressure*				
			sw1	*sw2*	*sw3*	*sw4*		*0.1*	*0.3*	*0.5*	*0.7*	*0.9*
COOLING	4	LOW (350 CFM/TON)	OFF	OFF	OFF	ON	CFM	**1401**	**1415**	**1424**	**1420**	**1392**
							WATTS	**315**	**386**	**467**	**534**	**601**
		NORMAL (400 CFM/TON)	OFF	OFF	OFF	OFF	CFM	**1581**	**1597**	**1613**	**1617**	**1601**
							WATTS	**435**	**517**	**588**	**680**	**741**
		HIGH (450 CFM/TON)	OFF	OFF	ON	OFF	CFM	**1803**	**1789**	**1810**	**1728**	**1644**
							WATTS	**605**	**711**	**800**	**799**	**795**
	3.5	LOW (350 CFM/TON)	ON	OFF	OFF	ON	CFM	**1216**	**1258**	**1273**	**1222**	**1179**
							WATTS	**232**	**286**	**348**	**425**	**504**
		NORMAL (400 CFM/TON)	ON	OFF	OFF	OFF	CFM	**1374**	**1411**	**1406**	**1401**	**1365**
							WATTS	**319**	**382**	**460**	**530**	**626**
		HIGH (450 CFM/TON)	ON	OFF	ON	OFF	CFM	**1577**	**1585**	**1605**	**1589**	**1593**
							WATTS	**431**	**512**	**582**	**655**	**724**
	3	LOW (350 CFM/TON)	OFF	ON	OFF	ON	CFM	**1071**	**1071**	**1053**	**1004**	**965**
							WATTS	**173**	**223**	**284**	**355**	**400**
		NORMAL (400 CFM/TON)	OFF	ON	OFF	OFF	CFM	**1176**	**1208**	**1213**	**1197**	**1144**
							WATTS	**223**	**284**	**339**	**396**	**487**
		HIGH (450 CFM/TON)	OFF	ON	ON	OFF	CFM	**1341**	**1355**	**1355**	**1355**	**1317**
							WATTS	**300**	**366**	**432**	**196**	**602**
	2.5	LOW (350 CFM/TON)	ON	ON	OFF	ON	CFM	**847**	**854**	**861**	**824**	**785**
							WATTS	**118**	**163**	**227**	**271**	**298**
		NORMAL (400 CFM/TON)	ON	ON	OFF	OFF	CFM	**951**	**971**	**984**	**955**	**925**
							WATTS	**170**	**200**	**282**	**333**	**365**
		HIGH (450 CFM/TON)	ON	ON	ON	OFF	CFM	**1121**	**1127**	**1149**	**1076**	**1070**
							WATTS	**197**	**254**	**302**	**396**	**440**

	AIRFLOW SETTING	DIP SWITCH SETTING			EXTERNAL STATIC PRESSURE				
		SW7	SW8		0.1	0.3	0.5	0.7	0.9
HEATING	LOW	ON	ON	CFM	791	822	749	732	723
				WATTS	103	148	209	245	281
	MEDIUM LOW	OFF	ON	CFM	938	958	971	875	882
				WATTS	141	189	237	302	337
	MEDIUM HIGH	ON	OFF	CFM	1124	1152	1163	1152	1101
				WATTS	210	267	330	383	463
	HIGH	OFF	OFF	CFM	1420	1424	1446	1428	1397
				WATTS	325	447	476	536	613

ECM Blower delay settings:

	DIP SWITCH SETTING		HEATING ON & OFF DELAY OPTIONS	
	SW5	SW6	DELAY ON	DELAY OFF
HEATING	OFF	OFF	1 MIN	3 MIN
	ON	OFF	1 MIN	4 MIN
	OFF	ON	1 MIN	6 MIN
	ON	ON	1 MIN	8 MIN

NOTE: The fan off delay for cooling is fixed at 60 seconds. This is preset and non-adjustable.

FACTORY SETTING

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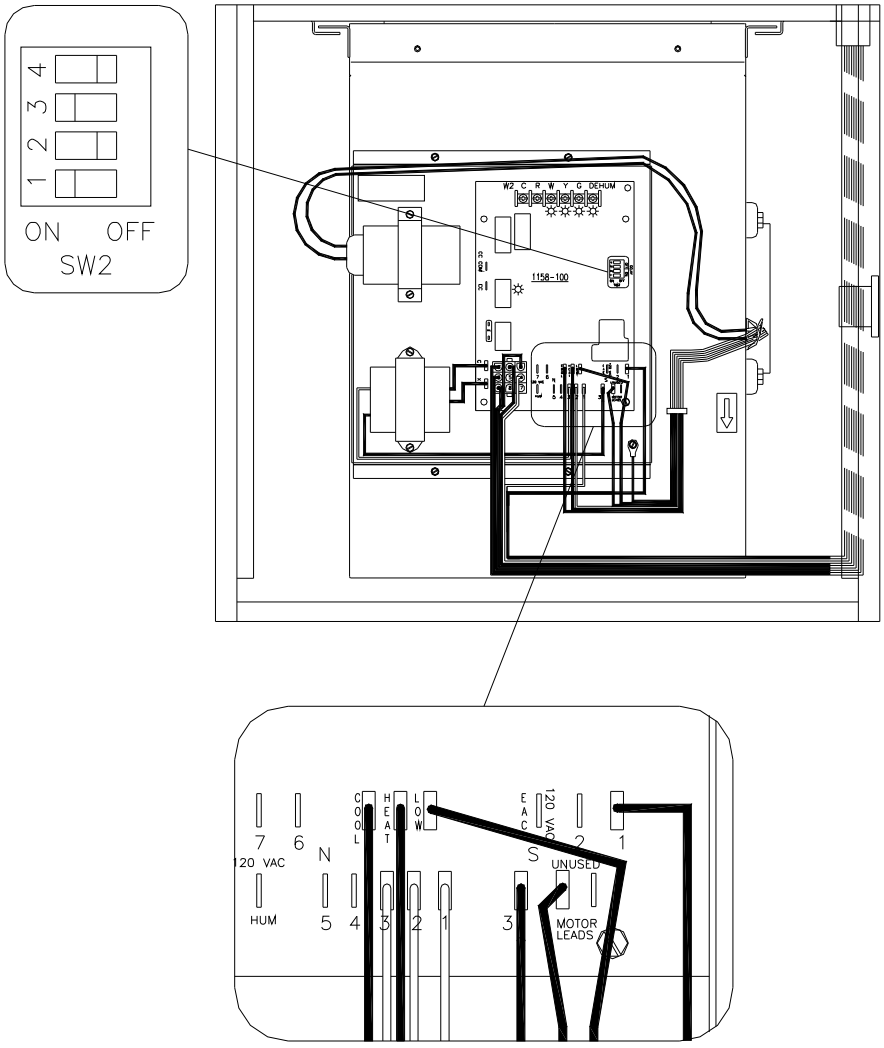

Fig-5B PSC unit

PSC Blower delay settings:

BLOWER DELAY SW2 SWITCH SETTINGS

N=ON F=OFF

	ON DELAY				OFF DELAY		
SW2	2	1	SEC.		4	3	MIN.
	F	F	30		F	F	2
FACTORY	F	N	60	FACTORY	F	N	4
	N	F	120		N	F	6
	N	N	240		N	N	8

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PSC air flow Speed Tap settings:

ALTERATIONS REQ'D FOR A/C @ DESIGN EXTERNAL STATIC PRESSURE				
COOLING UNIT	**HTG Speed by Input**			**Recommended CLG Speed**
	Low Fire	**Mid Fire**	**High Fire**	
24,000	Low	ML	MH	Low
30,000	Low	ML	MH	Med Low
36,000	Low	ML	MH	Med High
42,000	Low	ML	MH	Med High
48,000	Low	ML	MH	High

Speed Tap\ Static Pressure	**Furnace Airflow (CFM) vs. External Static pressure (in. WC.)**						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	930	915	912	910	822	774	730
ML	1155	1152	1130	1126	1085	1042	920
MH	1442	1432	1418	1382	1334	1293	1230
High	1802	1762	1705	1635	1569	1493	1428
	Furnace Motor Current Draw (Amps) vs. External Static pressure (in. WC.)						
Low	3.28	3.1	3.02	2.91	2.64	2.49	2.36
ML	4.18	4.02	3.91	3.74	3.59	3.34	2.95
MH	5.44	5.17	4.95	4.72	4.43	4.21	3.95
High	6.61	6.36	6.04	5.73	5.46	5.17	4.9

Speed Tap\ Static Pressure	**High Fire Temperature Rise vs. External Static pressure (in. WC.)**						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	90	91	91	92	101	108	114
ML	72	72	74	74	77	80	91
MH	58	58	59	60	62	64	68
High	46	47	49	51	53	56	58

Speed Tap\ Static Pressure	**Mid Fire Temperature Rise vs. External Static pressure (in. WC.)**						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	72	73	73	73	81	86	91
ML	58	58	59	59	61	64	72
MH	46	47	47	48	50	52	54
High	37	38	39	41	42	45	47

Speed Tap\ Static Pressure	**Low Fire Temperature Rise vs. External Static pressure (in. WC.)**						
	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Low	60	61	61	61	68	72	76
ML	48	48	49	49	51	53	60
MH	39	39	39	40	42	43	45
High	31	32	33	34	35	37	39

All installations and services must be performed by qualified service personnel.

J. HEAT EXCHANGER CLEANING INSTRUCTIONS:

⚠WARNING: THE HEAT EXCHANGER MUST BE CLEANED BY A QUALIFIED SERVICE PERSON.

It is important to inspect and clean the heat exchanger once a year, or as necessary, to remove any build-up of soot. A layer of soot on the inside of the heat exchanger will act as an insulator and reduce heat transfer, resulting in less efficiency.

To clean the heat exchanger, first turn off all power to the unit. Remove clean-out plugs, the vent connector pipe to the chimney, the burner, and the burner mounting plates. When removing the clean-out plugs, remove the screw at the 12 o'clock position. Then, pull clean-out plug straight back.

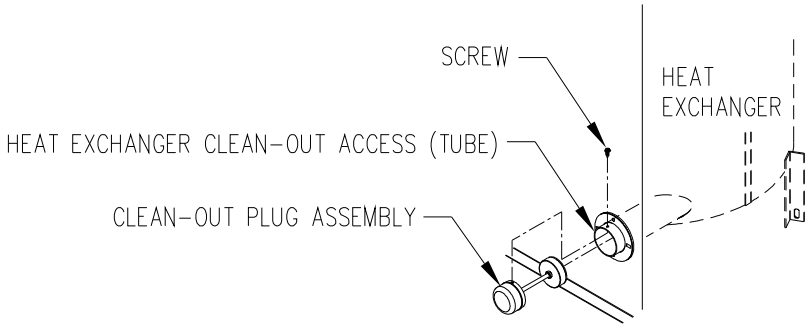


Fig. 6: Clean-out plug removal

With access to the inside of the heat exchanger through the burner area, clean-out openings, and vent pipe connection, it is possible to use a long, flexible wire brush and an industrial type vacuum cleaner to remove any soot build-up. **NOTE:** A one inch (outside diameter) vacuum cleaner hose will fit into the radiator.

To vacuum and brush the outer radiator of the heat exchanger, go through the clean-out openings in both directions, as shown in figure 7, below.

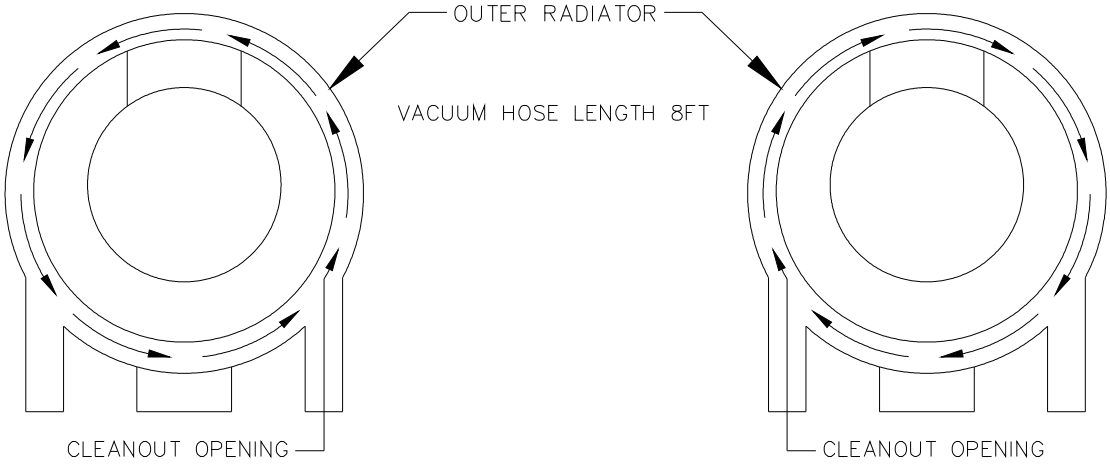


Fig. 7: Recommended method and device for cleaning inside of heat exchanger.

Reassemble the furnace to its original construction*. Remount the burner being certain that the air tube is properly inserted into the chamber opening (see section F). If heavy soot deposits were found in the heat exchanger, this may indicate the burner is out of adjustment.

*When returning clean-out plugs to their original position, insert plug and replace screw at the 12 o'clock position. This is sufficient for sealing the access tube.

All installations and services must be performed by qualified service personnel.

III. USERS INFORMATION SECTION

A. OIL SUPPLY: Do not allow the fuel tank to run completely empty. During the summer, keep the tank full to prevent condensation of moisture on the inside surface of the tank. If the fuel tank runs completely dry, it may be necessary to purge the lines of trapped air. Contact a qualified technician to bleed the lines and restart the burner.

OIL SUPPLY VALVE: Turn the oil supply valve off if the burner is shut down for an extended period of time.

B. COMBUSTION AIR SUPPLY: The burner requires a generous amount of clean combustion air to operate safely. Lack of adequate combustion air can result in erratic operation of the burner, noisy combustion, or fuel odors in the air. NEVER BLOCK THE FURNACE FROM THE SUPPLY OF COMBUSTION AIR. If there is an exhaust fan, dryer or return air grill in the furnace room, there should be increased concern and additional efforts may be required to provide adequate combustion air to the furnace at all times.

C. INSPECTION AREAS

VESTIBULE: The furnace vestibule area or burner compartment should be inspected by removing the front door of the furnace and looking for signs of excessive heat such as discoloration of components materials damage, from rust or corrosion, soot or carbon build-up.
EXTERIOR OF FURNACE: The furnace exterior should be inspected for signs of excessive heat such as discoloration of materials and damage from rust or corrosion.
FLUE PIPE, VENT PIPE OR CONNECTOR: The furnace vent pipe should be inspected for signs of rust, corrosion pitting or holes in pipe, and leakage around seams in pipe, indicated by soot or condensate streaks.
CHIMNEY OR VENTING SYSTEM: The furnace venting system should be inspected for signs of rust, corrosion pitting or holes, and signs of condensation or moisture leakage from the venting system.
If any of the above symptoms are evident, call a qualified heating contractor for assistance.

⚠CAUTION: DO NOT ATTEMPT TO MAKE REPAIRS YOURSELF!

⚠WARNING: The area around the furnace should be kept free and clear of combustible liquids and material, especially papers and rags.

⚠WARNING: NEVER burn garbage or refuse in your furnace. Never try to ignite oil by tossing burning papers or other material into your furnace.

⚠WARNING: This oil furnace is designed to burn No. 1 or No. 2 distillate fuel oil. NEVER USE GASOLINE OR A MIXTURE OF OIL AND GASOLINE.

⚠CAUTION: DO NOT ATTEMPT TO START THE BURNER WHEN:
1. Excess oil has accumulated,
2. The furnace is full of vapors
3. The combustion chamber is very hot.
IF ONE OR MORE OF THESE CONDITIONS EXIST, CONTACT A QUALIFIED SERVICE PERSON.

D. STARTING THE BURNER:
1. Turn the main service switch to "OFF" position.
2. Set thermostat substantially above room temperature.
3. Open shut-off valves in oil supply line to burner.
4. Turn service switch to furnace "ON". If burner starts and runs, but stops again on lockout, it may be necessary to bleed the lines or make burner combustion air adjustments. Contact a qualified service person to adjust and start burner.

All installations and services must be performed by qualified service personnel.

E. FILTER CLEANING AND LOCATION:
The air filters should be inspected each month and cleaned when dirty. Cleaning the air filters frequently may reduce airborne contaminants from entering the furnace and depositing in the furnace, duct system and home.

⚠WARNING: To avoid injury from moving parts, hot surfaces, or electrical shock, shut off the power to the furnace before removing any furnace access doors to service the air filters.

The filter rack will be located between the return air plenum and the return air opening on the side of the furnace, refer to figure 8. Slide the dirty filter out, clean it with a mild soap and water solution. Make sure filter is thoroughly dry before replacing.

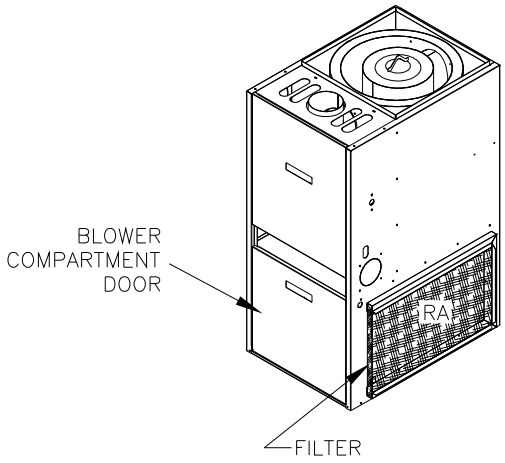


Fig. 8: Location of the air filter on the typical highboy furnace.

All installations and services must be performed by qualified service personnel.

COMBUSTION AND EFFICIENCY TESTING FOR OIL FIRED CENTRAL FURNACES.

Complete this form for each furnace installed. Read instruction manual carefully before making tests. Retain this form with furnace.

CUSTOMER

NAME

ADDRESS

CITY, STATE

HEATING SYSTEM

BURNER MODEL NO.	BLAST TUBE LGTH. INS.	AIR SHUTTER OPENING % OF MAX. (EST)

COMBUSTION CHAMBER CONDITION MATERIAL	FURNACE MODEL

TYPE OF VENTING SYSTEM

☐ MASONRY CHIMNEY ☐ METAL CHIMNEY ☐ SIDEWALL POWER VENTER ☐ MASONRY CHIMNEY W/INDUCER

☐ METAL CHIMNEY W/INDUCER ☐ MASONRY CHIMNEY W/METAL LINER

FUEL LINE FILTER	DRAFT CONTROL	FURNACE SERIAL NUMBER

COMBUSTION TESTS (Operate burner at least 10 minutes before starting tests.)

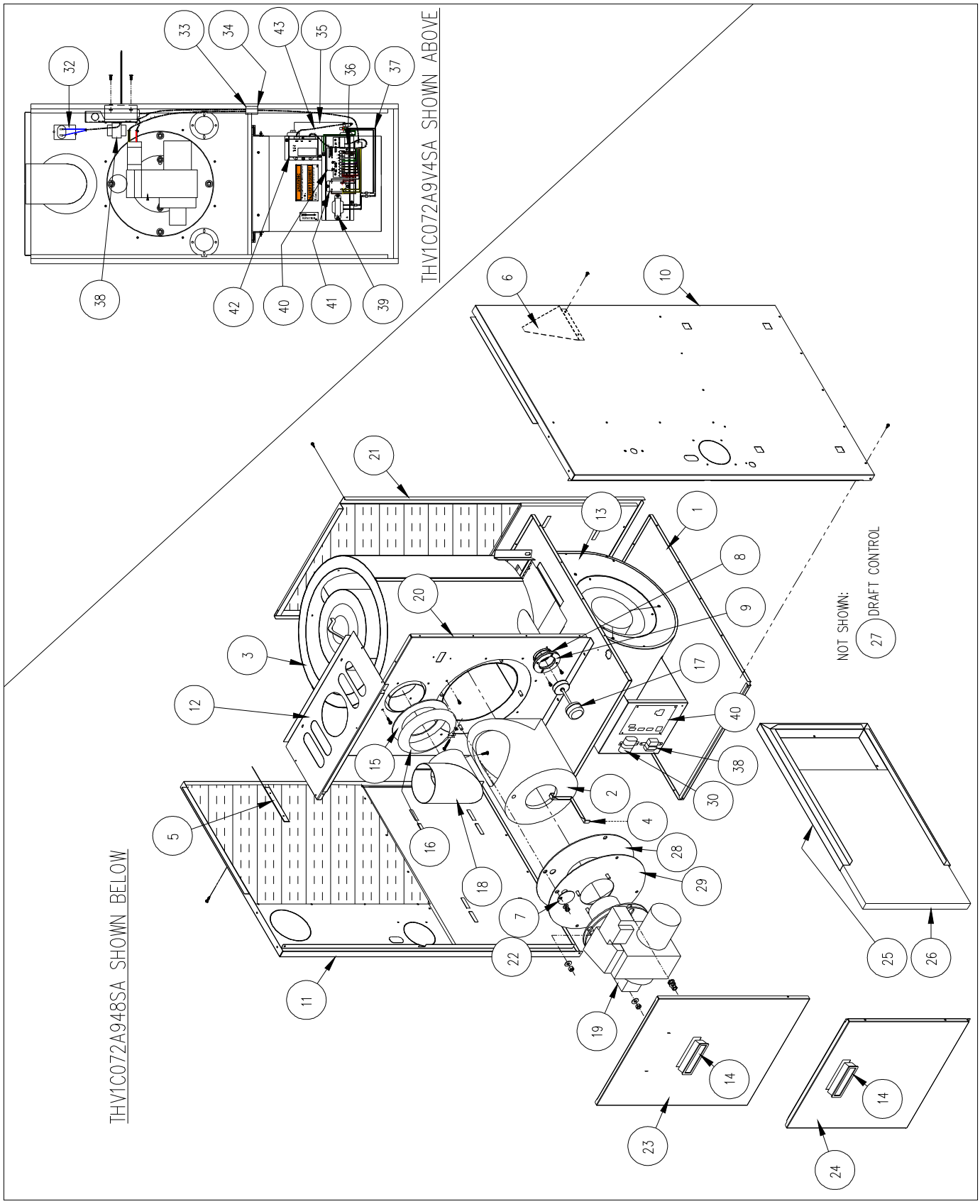
	INITIAL INSTALLATION	SERVICE	SERVICE	SERVICE
CO2 in stack pipe				
Draft Over-fire				
Draft in stack pipe				
Smoke number				
Gross stack temp.				
Furnace room temp.				
Net stack temp. (Gross stack minus furnace room temp.)				
Efficiency				
Nozzle size and spray				
Oil pump pressure				
Operation of Controls				
Burner Safety Controls				
Check for oil leaks				
Tests taken by				
Date				

NOTES:

INSTALLER NAME & ADDRESS

All installations and services must be performed by qualified service personnel.

APPENDIX-A Replacement Parts List



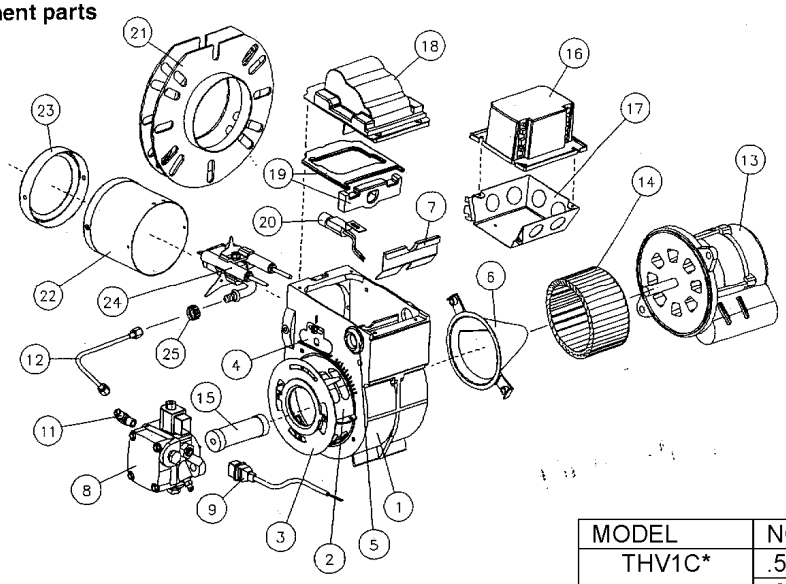
All installations and services must be performed by qualified service personnel.

ITEM	UNIT / PARTS DESCRIPTION	THV1C072A948SA		THV1C072A9V4SA	
		PART NO.	QTY.	PART NO.	QTY.
1	BASE	R18463	1	R18463	1
2	COMBUSTION CHAMBER, SOFT	R380691	1	R380691	1
3	HEAT EXCHANGER	R31924	1	R31924	1
4	CHAMBER RETAINER	R18557	1	R18557	1
5	BAFFLE, LEFT SIDE CASING	R11928	1	R11928	1
6	BAFFLE, RIGHT SIDE CASING	R11926	1	R11926	1
7	COVER, OVER-FIRE DRAFT OPENING	R18556	1	R18556	1
8	GASKET	R330215	2	R330215	2
9	TRIM PLATE	R618553	2	R618553	2
10	CASING, RIGHT SIDE	R628468-11	1	R628468-11	1
11	CASING, LEFT SIDE	R628467-11	1	R628467-11	1
12	PANEL, TOP FRONT	R618466-11	1	R618466-11	1
13	BLOWER SUB-ASSEMBLY	RS00S4157	1	RS00S4516	1
14	DOOR PULL	R320157	2	R320157	2
15	GASKET, FLUE COLLAR	R330073	1	R330073	1
16	DRAW COLLAR	R14121	1	R14121	1
17	CLEAN-OUT PLUG ASSEMBLY	RS00S4471	2	RS00S4471	2
18	ELBOW	R36050	1	R36050	1
19	OIL BURNER, BECKETT	R380704	1	R380704	1
20	PANEL, FRONT SEPARATOR	R618469	1	R618469	1
21	CASING, REAR	R628725-11	1	R628725-11	1
22	GASKET, OFDO COVER	R330343	1	R330343	1
23	DOOR, FRONT	R619176-11	1	R619176-11	1
24	DOOR, BLOWER ACCESS	R618464-11	1	R618464-11	1
25	FILTER RACK	R27373	1	R27373	1
26	FILTER	R370187	1	R370187	1
27	DRAFT CONTROL	R370110	1	R370110	1
28	GASKET, BURNER MOUNTING PLATE	R330212	1	R330212	1
29	PLATE, BURNER MOUNTING	R11891	1	R11891	1
30	CAPACITOR	R350073 10/370	1	——	
31					
32	LIMIT SWITCH	R350953	1	R350953	1
33	WIRE HARNESS, VESTIBULE	R350926	1	R350277	1
34	WIRE HARNESS, BLWR CMPRTMNT	R350927	1	R350278	1
35	MOTOR	RAOPS7657 1/2 H.P.	1	R350255 3/4 H.P. ECM	1
36	WIRE HARNESS, (MOTOR CONTROL)	——		R350849	1
37	WIRE HARNESS, (MOTOR POWER)	——		R350850	1
38	TRANSFORMER 24v	R350464	1	R350464	1
39	INDUCTOR (POWER CHOKE)	——		R350855 2.65 MH	1
40	CONTROL, FAN TIMER	R350922	1	R350393	1
41	RELAY	——		R350528	1
42	16x4 BOX PROGRAMMED	——		RAOPS7536	1
43	WIRE HARNESS, (16x4 BOX)	——		R350259	1

All installations and services must be performed by qualified service personnel.

EFL201 AFG BECKETT BURNER, R380704

Replacement parts



MODEL	NOZZLE SIZE	PART #
THV1C*	.50 x 80° A	R380279
	.60 X 80° A[1]	R380398
	.75 X 80° A	R380366

ITEM	DESCRIPTION	BECKETT PART #	TP PART #
1	BURNER HOUSING ASSY.	5874GY	
2	AIR BAND ASSY.	5151502	
3	AIR SHUTTER 4 - SLOT	3709	
4	ESCUTCHEON PLATE	3493	
	SCREW	4292	
5	HOLE PLUG	2139	
6	AIR GUIDE	31231U	
7	LOW FIRING RATE BAFFLE	5880	
8	*PUMP 120PSI	21844	R380674
	*SOLENOID	21755	R380654
9	VALVE CORD SET	21807U	R380653
11	PUMP ELBOW	2256	R320815
12	CONNECTION TUBE	5394	R380268
13	*MOTOR 1/7 HP 3450 RPM	21805E	R380644
14	BLOWER WHEEL 4 ¼ X 2 7/16 TAB	2999	R380271
15	*COUPLING	2454	R380241
16	*PRIMARY CONTROL	7505B1500	R350431
17	ELECTRICAL BOX	5770	
18	*IGNITER W/ GASKETS	51771U	R380645
19	IGNITER GASKET KIT	51304	
20	*CAD CELL w/ SOCKET	7006U	R350104
21	FLANGE WELDED TO TUBE	N/A	N/A
	GASKET	3616	R380270
22	AIR TUBE COMBINATION W/FLG, GUN ASSY & HEAD	58020165	R380108
	BLAST TUBE ONLY	AF60YHHSSS	
23	HEAD W/ SHIELD KIT	360063	R380320
24	ELECTRODE NOZZLE ASSY	NL60YH	R380706
	*ELECTRODES PAIR	5780	R380269
	STATIC PLATE, 3 5/8 U	3384	
25	SPLINED NUT	3666	R320121
	BULK HEAD FITTING	3488	R320120

[1] Nozzle installed in burner.

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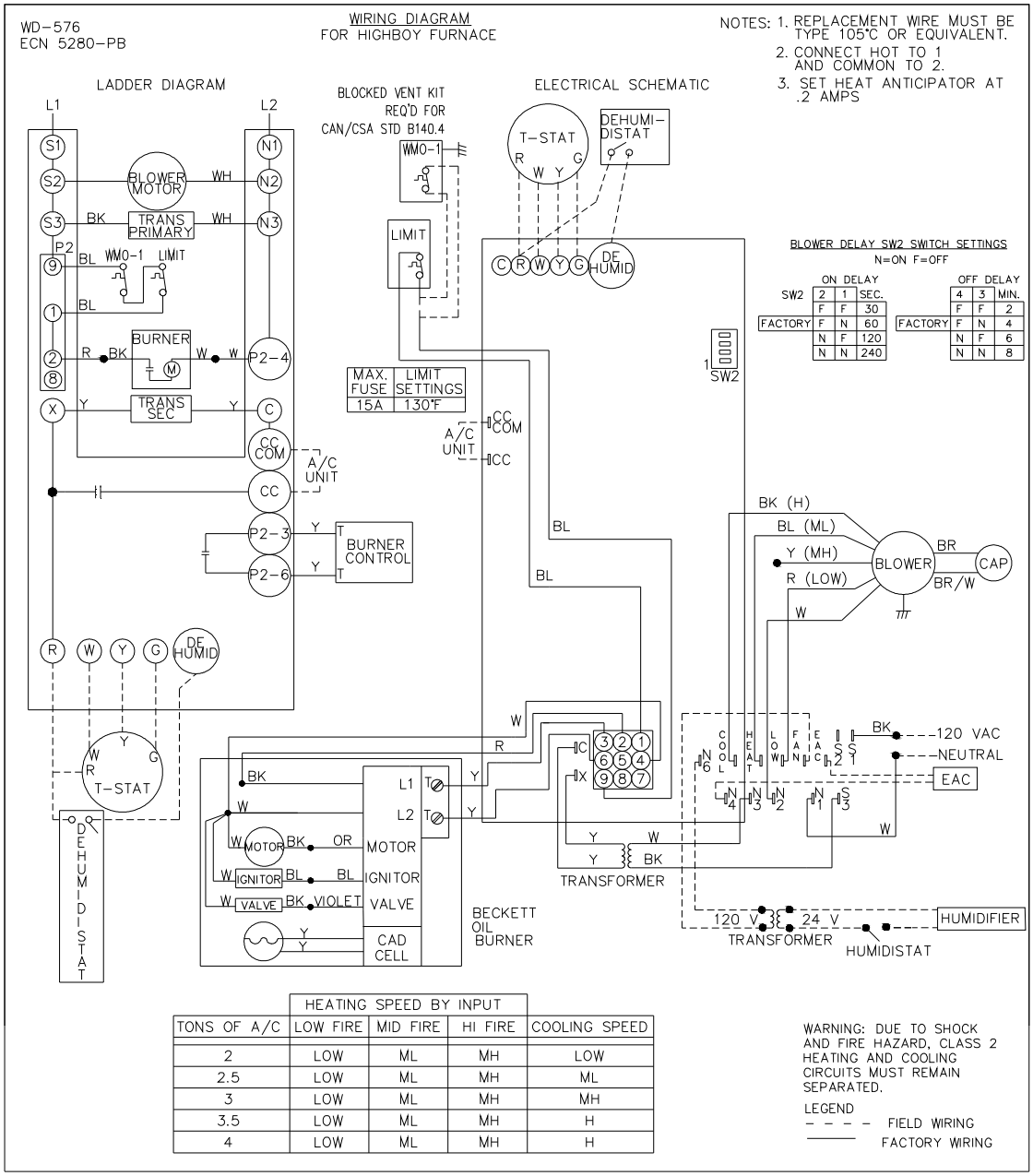
APPENDIX-B Wiring Diagrams

THV1C072A948SA

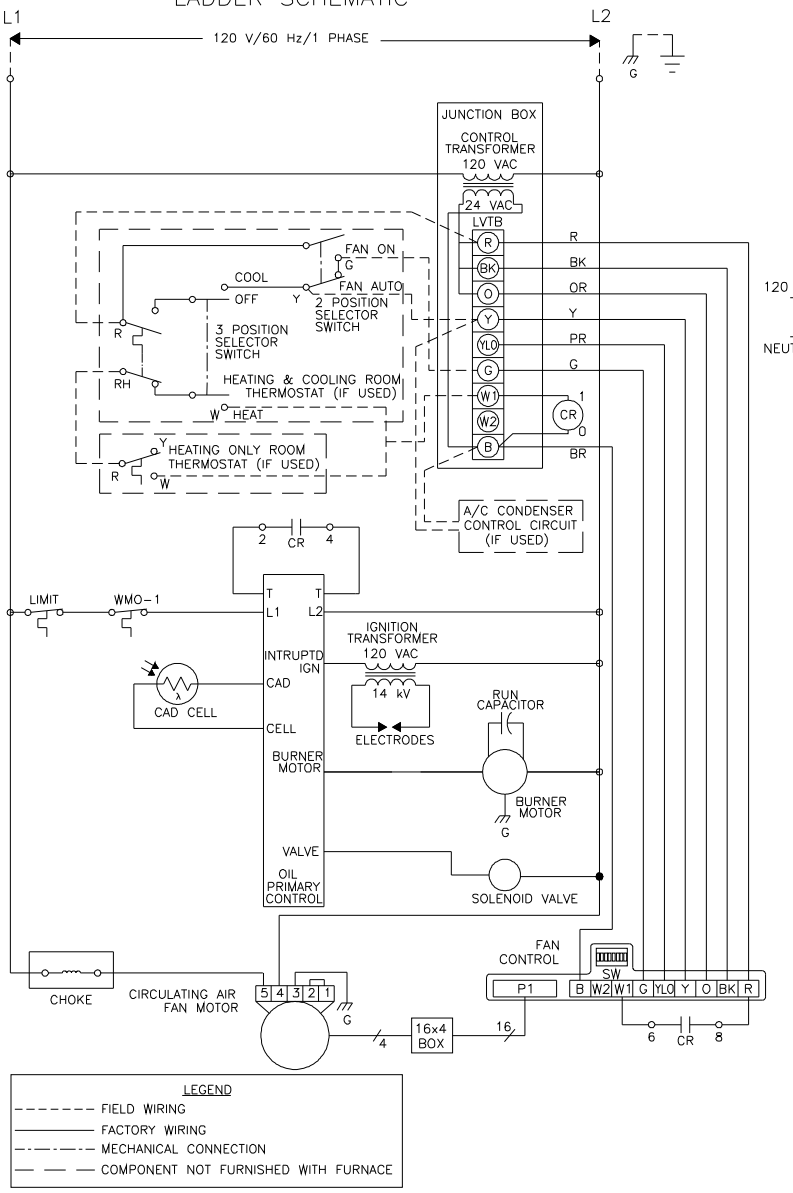


BLOWER SPEED TAPS
COOL = A/C Tap
HEAT = Heating Tap
LOW = Constant air or Dehumidifier

ELECTRICAL DIAGRAMS & OPERATING INSTRUCTIONS FOR HIGHBOY FURNACE

All installations and services must be performed by qualified service personnel.

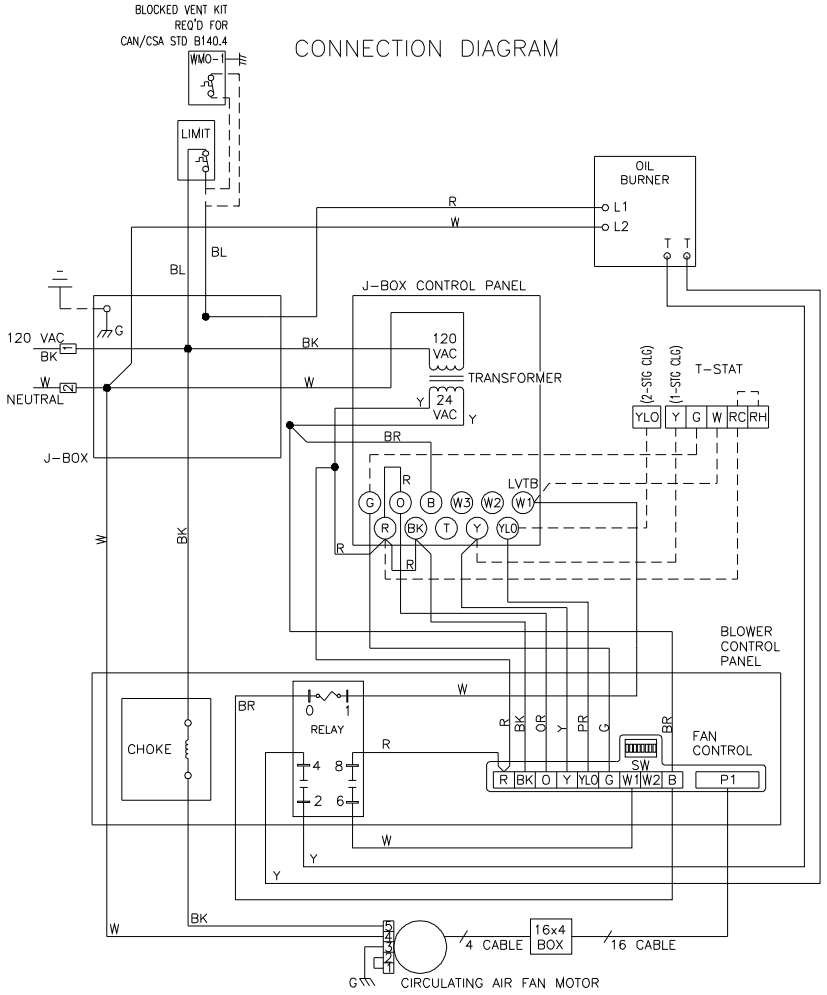
LADDER SCHEMATIC



LEGEND

- FIELD WIRING
- FACTORY WIRING
- MECHANICAL CONNECTION
- COMPONENT NOT FURNISHED WITH FURNACE

CONNECTION DIAGRAM



Notes:

1. Using wirenuts, connect power supply wire L1 to pigtail marked "1" and wire L2 to pigtail marked "2" in fan center. Connect an earth grounding wire to ground wire terminal in J-box.
2. If any electrical wiring must be replaced, new wiring must have an insulation type rated for 105°C or greater.
3. Use only copper conductors for all field and replacement wiring.
4. For adequate overcurrent protection, maximum acceptable size time delay type fuse or inverse time circuit breaker refer to name plate.
5. Typical room thermostat anticipator setting is 0.1 A.
6. Use Class I type electrical wiring to make thermostat connections to fan center and oil primary safety control.
7. Electrical schematic shown with heating system, cooling system (if equipped), and fan off.